



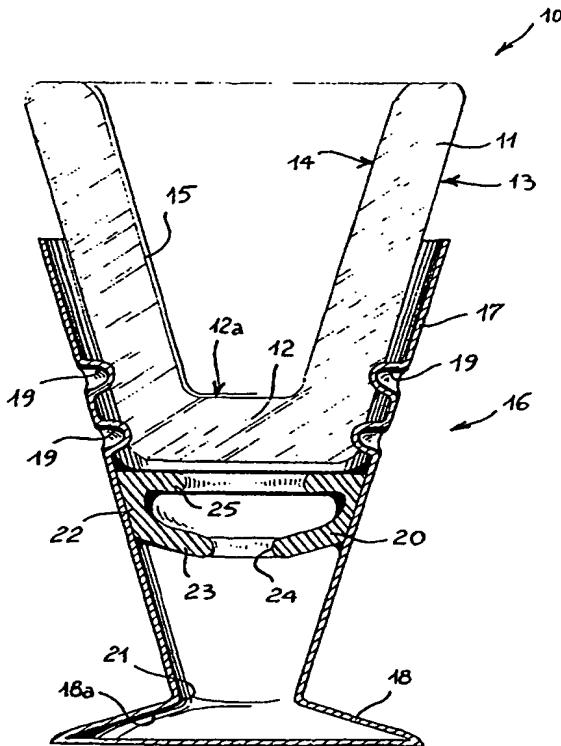
INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6 : A47G 19/22	A2	(11) International Publication Number: WO 00/00066 (43) International Publication Date: 6 January 2000 (06.01.00)
(21) International Application Number: PCT/IT99/00192		(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).
(22) International Filing Date: 28 June 1999 (28.06.99)		
(30) Priority Data: BO98A000395 29 June 1998 (29.06.98) IT		
(71) Applicant (<i>for all designated States except US</i>): REALE S.R.L. [IT/IT]; Via Zanardi, 2/5°, I-40131 Bologna (IT).		
(72) Inventors; and		
(75) Inventors/Applicants (<i>for US only</i>): GHEDINI, Lauro [IT/IT]; Via S. Isaia, 15, I-40123 Bologna (IT). MONTANARI, Mario [IT/IT]; Via dell'Arcoveggio, 186, I-40129 Bologna (IT).		
(74) Agent: PROVVISIONATO, Paolo; Provvisionato & Co. S.r.l., Via Mascarella, 85, I-40126 Bologna (IT).		

(54) Title: MOULDS FOR PRODUCING ICE BEAKERS AND A SUPPORT FOR SUPPORTING AN ICE BEAKER IN USE

(57) Abstract

A support for an ice beaker comprises a cup-shaped body with a side wall and a base for collecting the water resulting from the progressive melting of an ice beaker housed in the cup-shaped body. The side wall comprises regions, arranged spaced apart on the side wall, for supporting and restraining the outer wall of an ice beaker. The ice beaker can be produced by an ice-making machine comprising a condensation plate with housings for receiving atomized water to form frozen elements. Each housing of the condensation plate comprises a conical side wall and a base wall, the taper of the side-wall being sufficiently wide to bring about the formation of a frozen element which has a central cavity so as to be generally beaker-shaped. In the production method, an intermediate waiting step of predetermined duration is interposed between the interruption of the cooling and the start of the heating of the condensation plate.



FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece			TR	Turkey
BG	Bulgaria	HU	Hungary	ML	Mali	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MN	Mongolia	UA	Ukraine
BR	Brazil	IL	Israel	MR	Mauritania	UG	Uganda
BY	Belarus	IS	Iceland	MW	Malawi	US	United States of America
CA	Canada	IT	Italy	MX	Mexico	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NE	Niger	VN	Viet Nam
CG	Congo	KE	Kenya	NL	Netherlands	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NO	Norway	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	NZ	New Zealand		
CM	Cameroon	KR	Republic of Korea	PL	Poland		
CN	China	KZ	Kazakhstan	PT	Portugal		
CU	Cuba	LC	Saint Lucia	RO	Romania		
CZ	Czech Republic	LI	Liechtenstein	RU	Russian Federation		
DE	Germany	LK	Sri Lanka	SD	Sudan		
DK	Denmark	LR	Liberia	SE	Sweden		
EE	Estonia			SG	Singapore		

Moulds for producing ice beakers and a support for supporting an ice beaker in use

The present invention relates to the field of ice beakers. The invention has been developed, in particular with regard to moulds for producing ice beakers and to a support for supporting such a beaker in use.

German utility model DE 296 09 553 U relates to a support for use for ice beakers and to a system for producing them by means of complementary male and female moulds. It is known, from this document, to arrange the male and female moulds in a manner such that, when they are coupled, they form a series of cavities to be filled with water. When the water is frozen, it forms beaker-shaped frozen structures which are removed by separating the male mould from the female mould. In order to use an ice beaker of this type, it is necessary to provide a respective support which supports the beaker and possibly collects the water which is produced as the beaker gradually melts. Naturally, the support must be formed in a manner such that the water collected does not escape from the support when the support and the ice beaker are inclined for drinking.

The above-mentioned utility model describes and illustrates a type of metal support with a frusto-conical body supported by a hollow stem in which the water produced as the ice beaker melts is collected. The side walls of the frusto-conical body widen out from the stem and are inclined in a manner substantially similar to the inclination of the walls of the ice beaker to be housed in the support. Extending from the upper edge of the frusto-conical support are elongate appendages at the ends of which stop pins are formed for welding to the outer wall of the ice beaker in order to hold it in position relative to the support, both in the erect position of the support and in the inclined position adopted by the support and by the ice beaker during drinking.

Known supports have many disadvantages, the first of which is the fact that the ice beaker is not stable inside the support and, in particular, tends to move to and fro to a greater extent the more its outer wall has melted. Moreover, as the ice beaker melts, it also tends

to move down towards the base of the support so that its to and fro movements can lead to some portions of the outer wall of the ice beaker moving towards the side wall of the support until they touch it; in this condition, some of the water of the melting ice beaker may find its route towards the base or stem of the support obstructed and may overflow from the support. This dripping outside the support is added to the condensation which forms on the outside of the support because of the intense cooling due to direct contact with the ice, possibly over quite large areas.

Another disadvantage of known supports is that it is difficult to remove all of the water held in the supports when they are being prepared for subsequent use. The presence of the partition in fact gives rise to an undercut which prevents the water from escaping not only whilst the support is in use, which is desirable, but also after use when the ice beaker has completely melted.

Another disadvantage of the known supports is that the cost of the ice beaker is considerably less than that of the support, which has to be re-used over and over again. This renders the use of the supports of known type disadvantageous when it is not possible to check that they are all returned after use, for example, in crowded locations such as discotheques, swimming pools, beaches, sports stadia, and the like.

A further disadvantage of known supports is that they are quite complex to manufacture and bulky to store. Moreover, the aesthetic form of these supports is defined at the production stage and it is therefore particularly expensive to differentiate production in order to offer for sale supports of various shapes and styles.

More generally, in addition to the drawbacks connected with known supports, the use of ice beakers is not very widespread because of the substantially small-scale and complex production technique of the beakers themselves. Productivity for ice beakers produced by known techniques is generally low which limits their distribution in locations much frequented by the public. Moreover, for the domestic use of ice beakers, in which the limited number of ice beakers which can be produced by conventional techniques would

not be a critical factor for their distribution, the considerable bulkiness of the known male and female moulds, combined with the need to provide special supports, also restricts the distribution of ice breakers in the domestic field.

An object of the present invention is to overcome the drawbacks of the prior art, first of all by proposing a support for an ice beaker which is easy to store or in any case compact, easy to use and of pleasant appearance. A further object of the invention is to propose a support for an ice beaker which supports an ice beaker firmly, even at an advanced stage of melting, and which drastically reduces the risk of water dripping out of the support. Another object of the invention is to provide a support of the type indicated above which is simple and inexpensive to produce so that its cost is quickly offset to the point at which it can even be used only once as a "disposable" product. A further object of the invention is to provide a support for an ice beaker which is aesthetically pleasing and which can be offered in aesthetic configurations of various types without this leading to high production or storage costs. Yet another object of the invention is to provide a mould for producing ice breakers which can easily also be used as a support for the ice beaker.

To achieve the objects indicated above, the subject of the invention is a support for an ice beaker with an inclined outer wall which is characterized in that it comprises regions, arranged spaced apart along the height of the beaker when it is in the upright position, for supporting and restraining the outer wall of an ice beaker.

In one embodiment, the supporting and restraining regions comprise projections arranged spaced apart on the side wall of a beaker-shaped body and oriented towards the interior thereof, the side wall of the support being inclined to an extent substantially equal to the inclination of the side wall of the ice beaker. Preferably, but not exclusively, the projections are formed integrally with the beaker-shaped body which can advantageously be produced by moulding of a plastics material, although the possibility of using other materials should not be excluded. The arrangement of the projections may adopt a configuration such as additionally to confer an aesthetic quality on the support.

An additional feature of the embodiment mentioned above is the presence of a flexible partition which can easily be removed from the support and which has the dual function of holding the water in the base of the support, even when the support is inclined for drinking, and of preventing the ice beaker from moving downwards in the support beyond a predetermined limit to prevent the ice from obstructing the regions in which the water flows towards the base of the support and/or to prevent the ice from coming into contact with relatively large areas of the side wall of the support.

In another embodiment, the support for an ice beaker comprises a spiral member the coils of which project inwardly relative to the side wall of the support. The spiral member conveys the water produced during the melting of the ice towards the base of the support and, at the same time, constitutes a barrier for the water which has collected in the base of the support when the support is inclined during drinking. The spiral member may be removable and, in this case, can be used in association with any conventional beaker the side wall of which is inclined to an extent substantially equal to the inclination of the side wall of the ice beaker. The spiral member may also be formed integrally on the side wall of a conventional beaker. In particular, it is possible to produce, in plastics material with programmed deformation, "disposable" beakers, the side walls of which can be deformed before use to form spiral recesses.

One of the advantages of the present invention is, in particular, that the ability to manufacture "disposable" supports in large quantities from inexpensive plastics material can favour the use of ice beakers in large quantities, particularly in locations much frequented by the public. In this case, the number of ice beakers which can be produced by conventional methods by means of male and female moulds could be inadequate, particularly in view of the fairly long periods of time which are required for the water to freeze in the cavities defined between the male and female moulds. To avoid this drawback, a further subject of the invention is an ice-making device particularly suitable for producing large quantities of ice beakers usable with a support of the type indicated above.

Finally, a subject of the invention is a method of producing ice beaters, particularly for domestic use, in which the mould can act as a support for the ice beaker formed by freezing of the water in the mould.

Further characteristics and advantages will become clear from the following description of preferred embodiments described with reference to the appended drawings provided by way of non-limiting example, in which:

Figure 1 shows, in perspective, a first embodiment of a support comprising projections arranged spaced apart on its side wall;

Figure 2 is a section taken on the line II-II of Figure 1,

Figure 3 is a plan view of a partition particularly suitable for use with the support of Figures 1 and 2,

Figure 4 shows, in perspective, another embodiment of the support, comprising a removable spiral element,

Figure 5 is a section taken on the line IV-IV of Figure 4,

Figure 6 is an enlarged view of a detail of Figure 5, showing a preferred configuration of the spiral element,

Figure 7 is a longitudinal section through another embodiment of the support, of the "disposable" type, in the deformed, operative configuration in which the side wall is formed with a spiral,

Figure 8 shows, in longitudinal section, a set of supports of the type shown in Figure 7, in the storage or stowage configuration in which the side walls are undeformed,

Figure 9 shows a detail of Figure 8, in section and on an enlarged scale,

Figure 10 shows, in section, an element of a condensation plate particularly for use in an automatic machine for the large-scale production of ice breakers,

Figure 11 shows a detail of Figure 10, on an enlarged scale,

Figures 12 and 13 show, in section, the combination of a male mould and a female mould for producing ice breakers in single units and for their subsequent support, in the condition for producing the ice beaker, and in the condition of subsequent use, respectively,

Figure 14 shows, schematically and in section, a configuration of several of the male and female moulds of Figures 12 and 13 in the stacked condition, during the production of ice breakers,

Figures 15 to 17 show various stages of the production and use of an ice beaker by means of a mould which also acts as a support for the beaker, and

Figure 18 is a front view showing an embodiment of an ice beaker comprising a helical ridge on its side wall.

With reference now to Figures 1 and 2, an ice beaker 10 comprises an inclined side wall 11, in particular, of frusto-conical shape, closed by a base 12, the whole being formed entirely of ice by means of known production methods, or of innovative methods described further below. The inclined side wall 11 comprises an outer surface 13 and an inner surface 14 which, together with the inner surface 12a of the base 12 defines a cavity 15 for holding a drink.

The ice beaker can be housed in a goblet-like support 16 comprising a side wall 17 inclined to an extent substantially corresponding to the inclination of the side wall 11 of the ice beaker 10. In particular, the side wall 17 of the support 16 becomes narrower in its

lower portion, where it is joined to a widened, hollow support foot 18 of the support 16. The internal cavity 18a of the foot 18 communicates, through an opening 21, with the internal space defined by the side wall 17. The goblet-like support 16 is preferably made of plastics material or of stainless steel, although the possibility of using materials of different types is not excluded.

Dimples 19 formed on the side wall 17 of the goblet-like support 16, for example, by moulding or punching, are spaced apart both peripherally along circles lying in the same horizontal plane, and in the vertical direction. The arrangement of the dimples 19 may adopt the regular form shown in Figures 1 and 2 in which, purely by way of example and without excluding the possibility of the formation of different configurations, the upper and lower dimples are aligned along straight lines which are generatrices of the side wall 17 of the support 16.

Inside the support 16, beneath the row of lower dimples, there is an annular partition 20, preferably made of deformable or flexible material, for example, a silicone rubber suitable for use with foodstuffs. The annular partition 20 comprises a peripheral wall 22 from which a lower annular lip 23 extends and is inclined slightly downwards relative to a horizontal plane, defining a duct 24. Projecting appendages 25, which can best be seen in Figure 3, extend from the top of the peripheral wall 22 and define peripheral ducts 26. Naturally, the shape and number of the projecting appendages 25 shown in the drawings is given purely by way of example.

In use, the ice beaker 10 is placed inside the goblet-like support 16 in a manner such that the outer surface 13 of the ice beaker bears against the dimples 19 in a plurality of support regions. The slight pressure exerted by the weight of the ice beaker 10 on the dimples 19, together with the difference in temperature between the regions in contact, causes local melting of the surface 13 so that the dimples 19 penetrate the side wall 11 of the ice beaker slightly, preventing it from moving to and fro and being displaced which could otherwise occur when the support 16, and the ice beaker therewith, are inclined by a user in order to drink or sip the product previously poured into the cavity 15.

The dimples 19 also keep the ice beaker spaced from the side wall 17 of the support 16 so as to form a space in which the water which is produced during the slow melting of the ice beaker can flow. The water drips through the peripheral ducts 26, runs over the lower lip 23 of the annular partition 20, and is collected in the base of the goblet-like support 16, in the cavity 18a of the foot 18.

The ice beaker can be used to drink the product contained therein as long as no cracks or holes are formed in the base 12 of the beaker because of the progressive melting of the ice. Until the melting reaches this advanced stage, the amount of water which collects in the base of the goblet-like support 16 is not excessive and is therefore stopped by the lower lip 23 of the partition 20 even when the goblet-like support 16 is inclined in order to drink from the ice beaker 10.

During the progressive melting, the side wall 11 of the ice beaker 10 becomes thinner and the beaker tends to move downwards relative to the support 16. The dimples 19, which are also spaced apart vertically, nevertheless ensure that the ice beaker 10 is well supported and prevent it from moving to and fro and being displaced inside the support 16 as long as excessive melting of the beaker does not prevent its further use for drinking. The downward movement of the ice beaker 10 relative to the goblet-like support 16 is in any case limited by the presence of the partition 20 and, in particular, by the projecting appendages 25 on which the base 12 bears until it is almost completely melted. When the base 12 of the ice beaker 10 is bearing on the projecting appendages 25, the water can still drip towards the base 18 by virtue of the presence of the peripheral ducts 26.

After use, the support 16 can be re-used after removal of the water which has collected in its base. For this purpose, it suffices to remove the partition 20, for example, by inserting a finger in the duct 24 and pulling towards the upper opening of the goblet-like support. The deformability or flexibility of the partition 20, together with the inclination of the side wall 17 and the fact that the dimples 19 do not project excessively renders the removal of the partition 20 and its subsequent re-insertion in the support 16 quite easy.

Figures 4, 5 and 6 show another embodiment of a support according to the present invention. The ice beaker 10 is supported inside a beaker-shaped body 30 which may even be a conventional glass or plastics beaker, in which a rigid or flexible spiral element 31 has previously been inserted. In particular, the drawings show, by way of non-limiting example, a flexible spiral element 31, for example, made of silicone rubber suitable for use with foodstuffs, in which the coils 32 are spaced apart vertically by means of spacer feet 33, preferably formed integrally as appendages projecting from the coils 32.

Figure 6 shows in detail the cross-section of a preferred embodiment of the spiral element 31, in which each coil 32 comprises an outer edge 34 which bears sealingly on the side wall of the beaker-like body 30 and an inner edge 35 on which the outer surface 13 of the side wall 11 of the ice beaker 10 bears. The cross-section of the coils 32 may incorporate an inner core 36 of more rigid material, for example, a harmonic steel wire or a thread of resilient plastics material. The spacer feet 33 may in turn comprise respective bearing rims 37.

In use, the water which is produced during the progressive melting of the ice beaker 10 is collected by the spiral element 31 which directs it towards the base of the beaker-shaped body 30. When the beaker-shaped body 30 is inclined in order to drink from the ice beaker 10, the coils 32 of the spiral element 31 act as a barrier to the water, preventing it from escaping from the beaker-shaped body 30. During the melting and progressive thinning of its side wall 11, the ice beaker 10 moves gradually downwards in the beaker-shaped body 30, encountering ever narrower coils 32 which in any case prevent the ice beaker from moving to and fro.

In another embodiment, shown in Figures 7, 8 and 9, a support 40 with programmed deformation is provided in the form of a "disposable" beaker, for example, made of plastics material. As can be seen in detail in Figure 9, initially, the deformable support 40 has a substantially smooth frusto-conical side wall 41. An annular indentation 43 is preferably provided in the vicinity of the base 42 of the deformable support 41 to act as a

spacer between one support and another in the storage and stowage configuration shown, so as to favour the removal and separation of one deformable support from another. Spiral deflection and deformation lines are predefined on the side wall 41 of the deformable support 40 so that, starting from the undeformed configuration of Figure 8, slight squashing of the deformable support 40 - possibly accompanied by slight twisting of the base 42 relative to the mouth - brings about the appearance of a spiral corrugation 44 in the side wall 41. It is thus possible to provide supports 40 in large quantities at a very low cost, enabling drinks to be supplied easily and inexpensively in ice beakers in locations much frequented by the public. The function of the deformable support 40 in use is substantially similar to that described above with reference to the spiral element 31 shown in Figures 4 to 6.

In order to provide large quantities of ice beakers 10, in particular but not exclusively for use in locations much frequented by the public, it may be advantageous to use an automatic ice-making machine, rather than to rely on the production of ice beakers in small batches by means of known methods using male and female moulds. Ice-making machines are generally known and will not therefore be discussed in detail. For the purposes of the present description, it suffices to note that these machines comprise a condensation plate comprising recesses, normally made of metal, more particularly, nickel-plated copper, against which jets of water are directed by means of ejectors disposed under the plates. The plate is cooled to a temperature such as to bring about freezing of the water and the formation of small cubes or blocks of ice inside the recesses. By raising the temperature of the plate above freezing point, the blocks of ice are detached from the recesses in the plate and fall into a collecting tank, ready for use.

In greater detail, known methods for producing ice by means of the above-mentioned machines, comprise the steps of:

- a) cooling the condensation plate,
- b) directing a flow of atomized water towards the condensation plate for a predetermined

period of time sufficient to form frozen elements,

- c) interrupting the cooling of the condensation plate, and
- d) interrupting the flow of atomized water and heating the condensation plate to permit detachment of the frozen elements.

The Applicant has found that, for optimal production of ice beakers by the above-mentioned method, it is preferable to interpose between the interruption of the cooling and the start of the heating of the condensation plate, an intermediate waiting step of predetermined duration, preferably but in non-limiting manner, of about 30 seconds. The flow of atomized water directed towards the condensation plate is preferably maintained during the intermediate waiting step. During the cooling step a), the duration of which is, for example, about 30 minutes, the condensation plate is cooled to a temperature of about -10°C.

One of the main advantages of this method consists of a reduction in the thermal shock to which the ice beakers are subjected, reducing the risks of breakage of the beakers.

Figures 10 and 11 show a specific embodiment of a condensation plate 50 comprising a base 51, preferably, but in non-limiting manner, made of plastics material, for example ABS, arranged horizontally and having circular openings 52 each having a shaped rim 53 in which there is a peripheral notch 54 in which a collar 55 of a cup-shaped vessel 56 with a substantially conical side wall 57 is engaged. The maximum inside diameter of the side wall 57 is slightly less than the diameter of the circular opening 52 so as to favour the detachment of a conical ice beaker upon completion of its formation inside the cup-shaped vessel 56 as a result of the freezing of water supplied by ejectors disposed beneath it. The taper of the side wall 57 of the cup-shaped vessel 56 is such that the water supplied by the ejector freezes gradually, following the shape of the side wall, leaving a central cavity for holding a liquid product to be drunk or sipped when the finished ice beaker is in use.

Figures 12, 13 and 14 show an alternative system for the production and use of ice beakers in which moulds 60, for example, made of plastics material, preferably for "disposable" use, are provided, each mould comprising a male element 60a with a frusto-conical wall 61, a base 62, and an annular rim 63 which is turned outwards. The rim 63 is extended outwardly by an annular band 64 for connection to an opening 65 of a female element 60b also having a substantially frusto-conical wall 66 and a base 67. The annular connecting band 64 can be removed from the mould 60, for example, by means of a tab 64a so as to separate the male element 60a from the female element 60b, in use.

The female element 60b has an annular rim 68 bent like a hook to form an annular seat 69. The base 67 has a central hole 70 from which an annular flange 71 extends. The side wall 66 has a slight spiral corrugation 72 or, as already described with reference to the embodiment of Figures 7 to 9, a spiral programmed-deformation region.

As can be seen in Figure 14, several moulds 60 can easily be stacked one upon another after the internal cavities defined by the male elements 60a and by the female elements 60b have been filled with water. The moulds thus filled and preferably stacked are placed in a freezer for the period of time necessary to freeze the water completely, forming ice breakers 10 housed in the moulds 60.

In order to use the ice breakers 10 to drink or sip a drink, it suffices to remove the annular connecting band 64 and thus to separate the male element 60a from the female element 60b, the side wall 66 of which is deformed as described above in order to form or to accentuate the spiral corrugation 72. When this is done, the ice beaker 10 emerges partially from the female element 60b and is spaced from the side wall 66 thereof. The female element 60b is then housed in the male container 60a, the annular rim 63 of which is fitted in the annular seat 69. The central hole 70 thus becomes the opening through which the water resulting from the progressive melting of the ice beaker 10 flows. The annular flange 71 prevents the water from escaping when the mould 60, which now has the function of a support for the ice beaker 10, is inclined for drinking.

Figures 15, 16 and 17 show an alternative embodiment of the mould for ice breakers which can also be used as an ice-beaker support. In detail, the mould comprises a main hourglass-shaped body 80 made, for example, of metal such as stainless steel, or glass, plastics material, rubber, etc. In the preferred embodiment shown in the drawings, the hourglass-shaped body 80 comprises two portions with frusto-conical walls, comprising an upper portion 81 and a lower portion 82 joined by a common base of least width which defines a central communication duct 83. The inclination of the frusto-conical walls to a common axis Y-Y is preferably identical for the two portions 81 and 82 which, however, again preferably but in non-limiting manner, are of different heights and thus have respective mouths 81a and 82a of different diameters. Support members 84 for an ice beaker 10 are formed on the frusto-conical wall of the upper portion 81 the height of which is less than that of the lower portion 82. For example, the support members may be formed by moulding or by punching in a manner similar to that described above with reference to Figures 1 and 2. The hourglass-shaped body 80 may advantageously be formed by deformation of a tube.

The mould/support of Figures 15 to 17 further comprises a removable cap 85 with an annular wall 86 and a substantially conical re-entrant wall 87 the taper of which is similar to the inclination of the wall of the lower portion 82. The cap 85 is mounted in the mouth 82a of the lower portion 82 in a removable, leaktight manner by a connection of known type, for example, a screw, snap or pressure connection or a connection of another type, possibly with the interposition of a sealing member, for example, a sealing ring.

In order to produce an ice beaker, it suffices to close the lower mouth 82a with the cap 85 and to pour through the upper mouth 81a a quantity of water such as practically to fill the lower portion 82 entirely or at least up to a level such that the top of the conical wall 87 of the cap 85 is well covered. As shown in Figure 16, the water fills the space between the annular and conical walls 86 and 87 of the cap 85 and the side wall of the lower portion 82 which defines a beaker-shaped cavity. As the water freezes, it thus forms an ice beaker 10 which can easily be removed from the mould by removing the cap 85 from the hourglass-shaped body 80. The beaker thus produced can subsequently be housed in the

upper portion 81 of the hourglass-shaped body 80 which has the spacer and support means 84, after the lower mouth 82a has been closed by the cap 85. The water produced during the progressive melting of the ice beaker 10 collects in the lower portion 82 of the hourglass-shaped body 80 and, by virtue of the undercut of the side wall of the lower portion 82 relative to the upper portion 81, does not escape even when the support is inclined in order to drink from the ice beaker.

An advantageous characteristic of the support described above in the preferred embodiment shown in Figures 15 to 17, is that the water resulting from the complete melting of the ice beaker can be removed from the hourglass-shaped body without any trouble after use. In fact, to do this, it suffices to invert the hourglass-shaped body 80 and/or to open the cap 85. The simplicity of the component parts of the mould/support which comprise large smooth surfaces also permits optimal cleaning thereof.

Another alternative embodiment of the mould for ice breakers according to the present invention can produce ice breakers of the type illustrated in Figure 18 in which the side wall 90 of the beaker 10 comprises a helical or spiral projection or ridge 91 formed by means of a corresponding recess on the side wall of the mould. The ridge 91 enables the ice beaker to be supported inside an outer support of the type illustrated, for example, in Figure 4, in a manner such that the progressive melting of the ice beaker favours its engagement in the support, reducing even further the risks of involuntary movements to and fro.

Naturally, the principle of the invention remaining the same, the forms of embodiment and details of construction may be varied widely with respect to those described and illustrated, without thereby departing from the scope of the present invention.

CLAIMS

1. A support for an ice beaker comprising a cup-shaped body with a side wall and a base for collecting the water resulting from the progressive melting of an ice beaker housed in the cup-shaped body, characterized in that the side wall comprises regions, arranged spaced apart on the side wall, for supporting and restraining the outer wall of an ice beaker.
2. A support for an ice beaker according to Claim 1, characterized in that the regions for supporting and restraining the outer wall of the ice beaker are spaced apart along the height of the beaker when it is in the upright position.
3. A support for an ice beaker according to Claim 1, characterized in that the supporting and restraining regions are defined by dimples spaced apart and formed in the side wall of the cup-shaped body.
4. A support for an ice beaker according to Claim 1, characterized in that the supporting and restraining regions are defined by a spiral element with coils projecting from the side wall of the cup-shaped body.
5. A support for an ice beaker according to Claim 4, characterized in that the spiral element is made of a flexible material and is mounted inside the cup-shaped body fitting closely against its side wall by means of resilient lips.
6. A support for an ice beaker according to Claim 5, each coil of the spiral element being spaced from the underlying coil by means of spacer elements.
7. A support for an ice beaker according to Claim 4, characterized in that the spiral element is formed by corrugation of the side wall of the cup-shaped body.
8. A support for an ice beaker according to Claim 7, characterized in that the corrugation is

produced by deformation, at the time of use, of the side wall of the cup-shaped body which has programmed-deformation regions.

9. A support for an ice beaker according to Claim 8, characterized in that, before use, the side wall of the cup-shaped body is substantially smooth to enable a plurality of cup-shaped bodies to be fitted one inside another to facilitate their storage.
10. A support for an ice beaker according to Claim 1, characterized in that it comprises a partition of flexible material interposed between the region housing the ice beaker and the base of the cup-shaped body.
11. A support for an ice beaker according to Claim 10, characterized in that the flexible partition comprises an annular wall which can be mounted selectively fitting tightly against the side wall of the cup-shaped body, an annular lip projecting from the annular wall and being inclined towards the base of the cup-shaped body.
12. A support for an ice beaker according to Claim 11, characterized in that the flexible partition further comprises projecting appendages which define peripheral ducts for allowing water to drip from the ice beaker towards the annular lip and then towards the base of the cup-shaped body.
13. A support for an ice beaker according to any one of claims 10 to 12, characterized in that the flexible partition is made of silicone rubber suitable for use with foodstuffs.
14. A support for an ice beaker according to any one of the preceding claims, characterized in that the support comprises mould members for the production of an ice beaker.
15. A support for an ice beaker according to Claim 14, characterized in that the mould members comprise at least one helical recess for forming a corresponding ridge on the wall of an ice beaker.

16. A support for an ice beaker according to Claim 14, characterized in that the mould members comprise a male element and a female element joined together separably, the male and female elements defining a beaker-shaped cavity to be filled with water to be frozen to produce an ice beaker, the female element and the male element being separated and fitted together again in an inverted configuration in use in order to act as a body for housing the ice beaker, and as a body for collecting the water generated by the progressive melting of the ice beaker, respectively.
17. A support for an ice beaker according to Claim 16, characterized in that the male element and the female element are joined together by a strip-like member which is integral with the elements and can be removed therefrom by tearing.
18. A support for an ice beaker according to Claim 16, characterized in that, in the configuration with the function of a mould, the supports can be stacked inside one another.
19. A support for an ice beaker according to Claim 16, characterized in that the side wall of the female element has programmed-deformation regions, a deformation of the side wall of the female element bringing about the formation of regions for supporting and restraining the ice beaker and for causing the ice beaker to emerge partially from the female element, in use.
20. A support for an ice beaker according to any one of Claims 16 to 19, characterized in that the female element comprises a base in which there is an opening surrounded by an annular flange.
21. A support for an ice beaker according to Claim 14, characterized in that the mould members comprise a side wall of the foot of the cup-shaped body defining a mouth.
22. A support for an ice beaker according to Claim 14, characterized in that the base is closed by a cap.

23. A support for an ice beaker according to Claims 21 and 22, characterized in that the cap comprises a central conical wall and is mounted removably on the foot of the cup-shaped body in order to close the mouth thereof.
24. A support for an ice beaker according to Claim 1, characterized in that the cup-shaped body defines a first portion of an hourglass-shaped body including a second portion, the two portions comprising frusto-conical side walls defining two mouths, one being a lower mouth and the other being an upper mouth, the lower mouth being closed selectively by a removable cap, the upper portion being intended to house an ice beaker, and the lower portion being intended, at two distinct operative stages, for producing an ice beaker, and for collecting the water resulting from the progressive melting of an ice beaker housed in the upper portion.
25. An ice-making machine, comprising a condensation plate with housings for receiving atomized water to form frozen elements, characterized in that each housing of the condensation plate comprises a conical side wall and a base wall, the taper of the side wall being wide enough to bring about the formation of a frozen element which has a central cavity so as to be generally beaker-shaped.
26. An ice-making machine according to Claim 25, characterized in that the conical side walls comprise at least one helical recess for the formation of a corresponding ridge in the wall of an ice beaker.
27. A method of producing ice breakers by means of an ice-making machine of the type comprising a condensation plate for receiving atomized water to form frozen elements, comprising the steps of:

- a) cooling the condensation plate,
- b) directing a flow of atomized water towards the condensation plate for a predetermined period of time sufficient to form frozen elements,

- c) interrupting the cooling of the condensation plate,
- d) interrupting the flow of atomized water and heating the condensation plate to permit detachment of the frozen elements,

characterized in that an intermediate waiting step of predetermined duration is interposed between the interruption of the cooling and the start of the heating of the condensation plate.

28. A method according to Claim 27, characterized in that the flow of atomized water directed towards the condensation plate is maintained during the intermediate waiting step.

29. A method according to Claim 27, characterized in that in that the intermediate waiting step has a duration of about 30 seconds.

30. A method according to Claim 27, characterized in that, during step a), the condensation plate is cooled to a temperature of about -10°C, the duration of step a) being about 30 minutes.

1/8
FIG.1

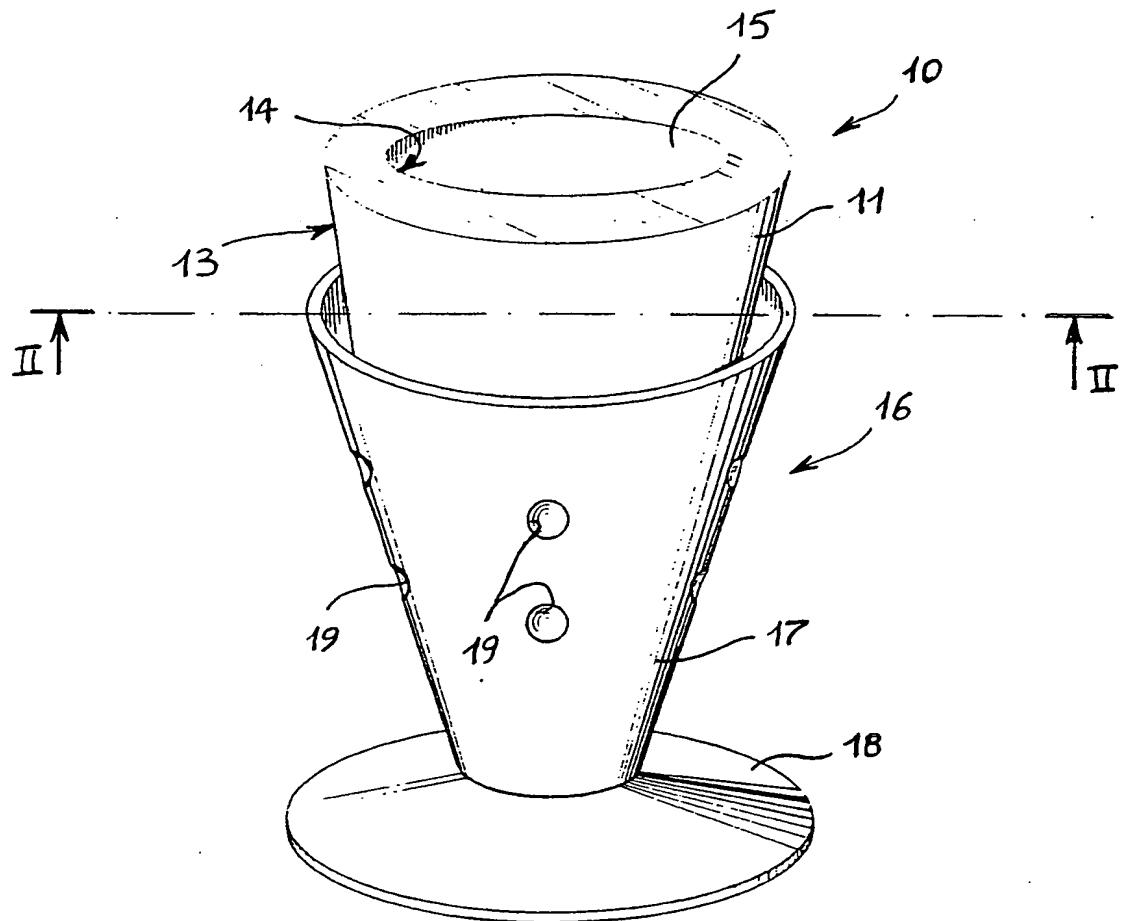
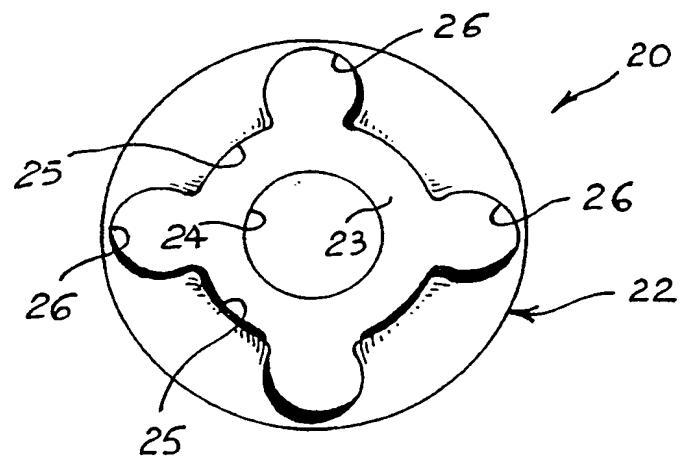


FIG.3



218

FIG.2

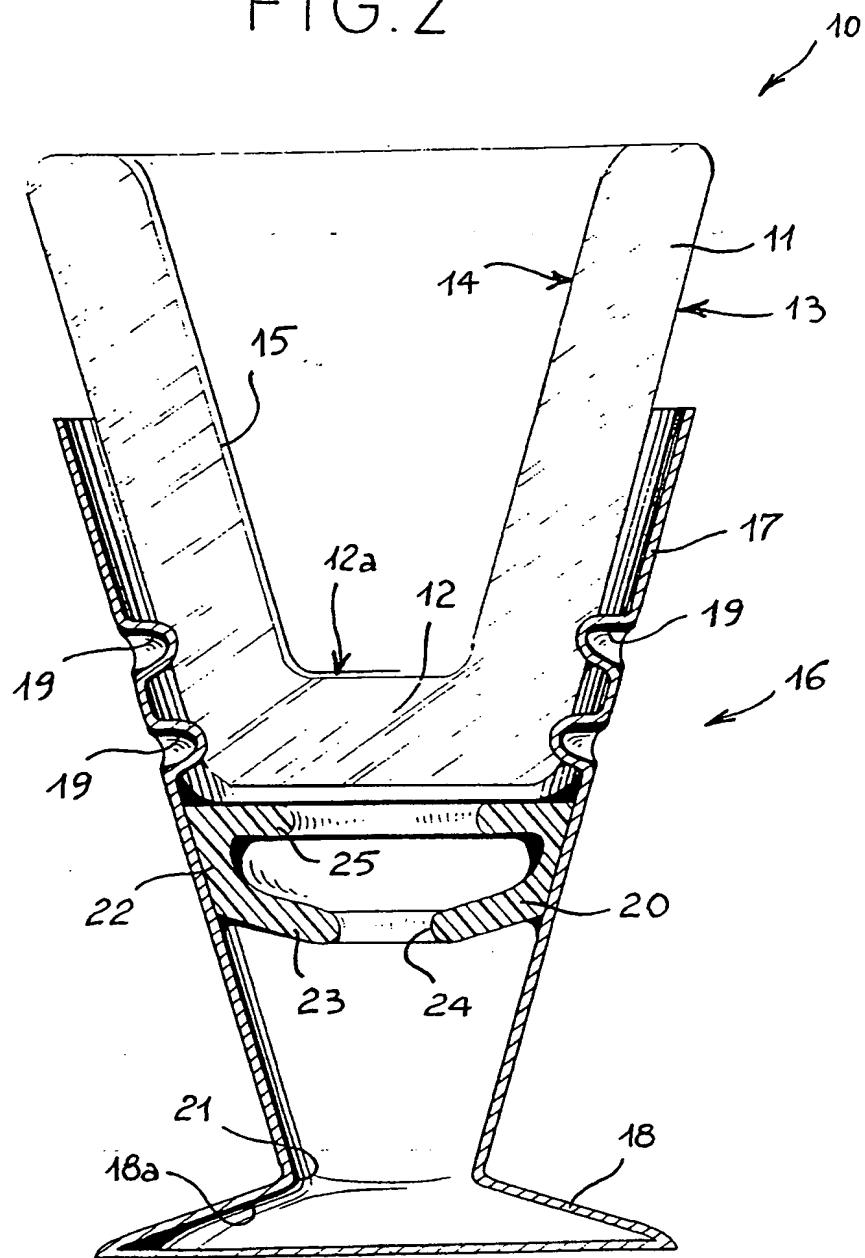


FIG. 4

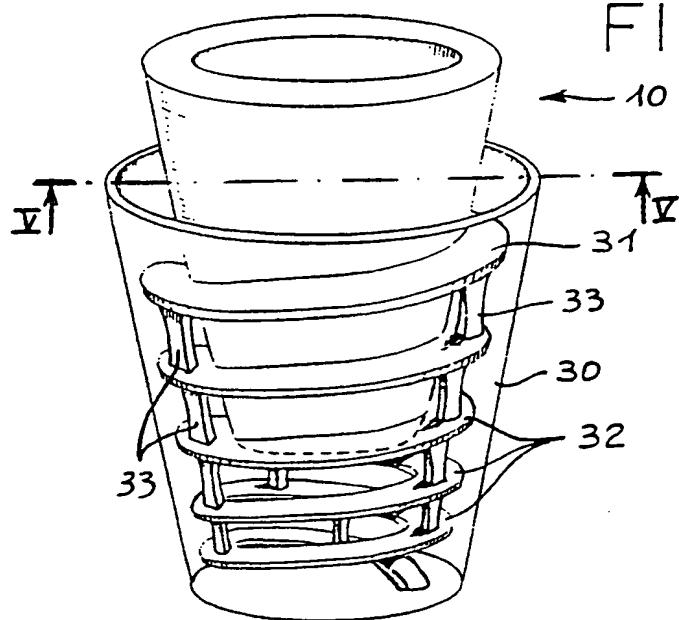


FIG. 6

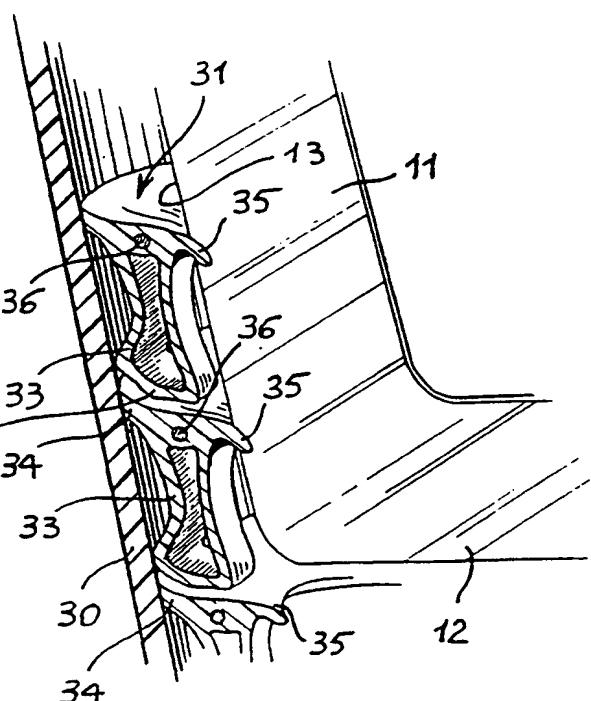
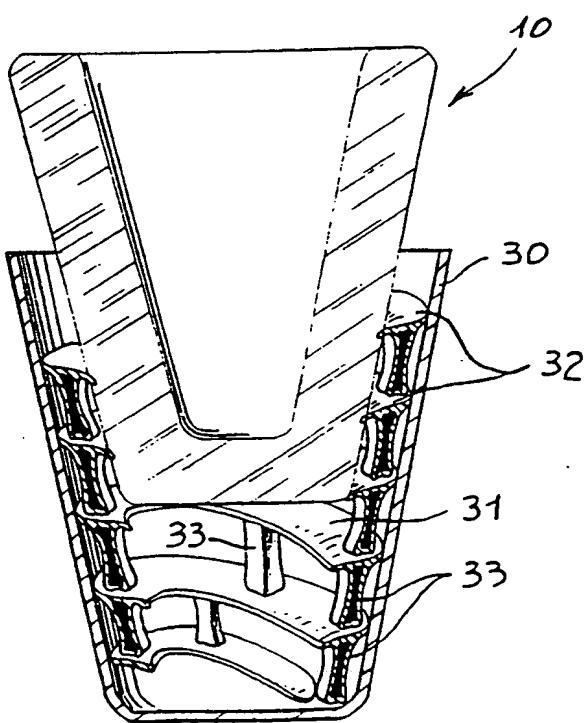


FIG. 5



4/8

FIG.7

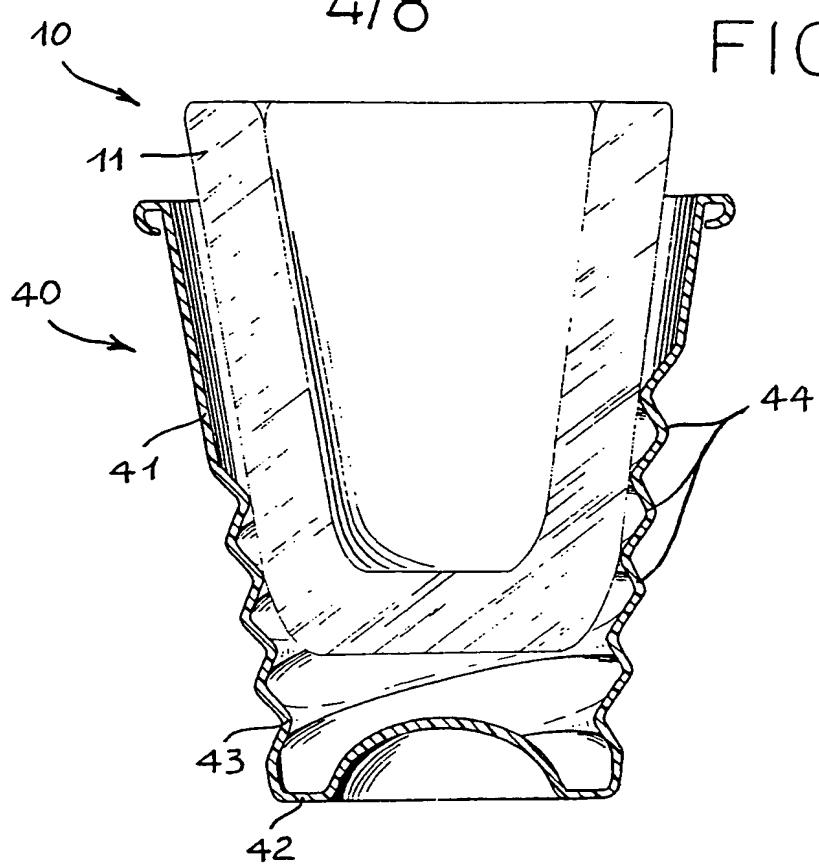


FIG. 8

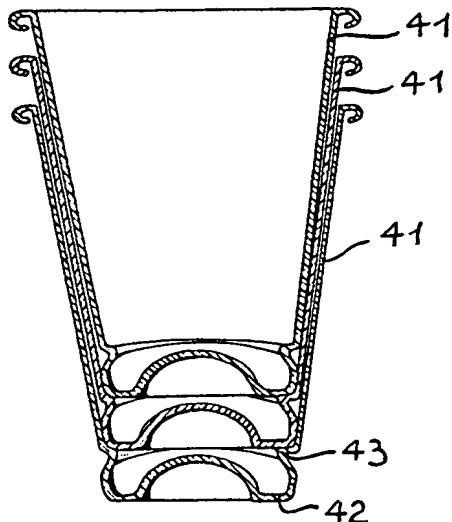
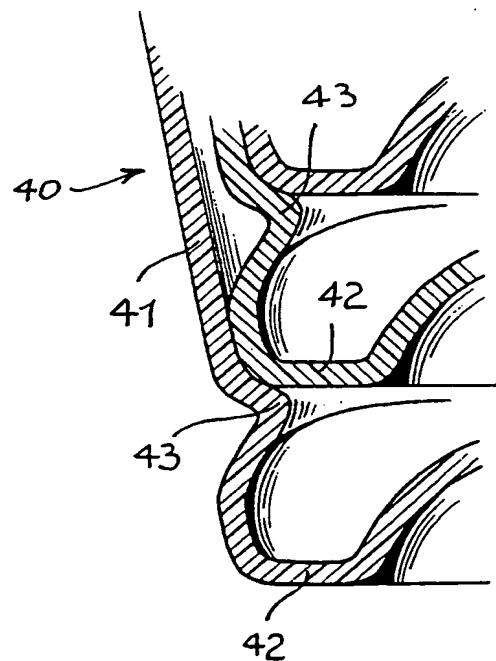


FIG. 9



5/8

FIG.10

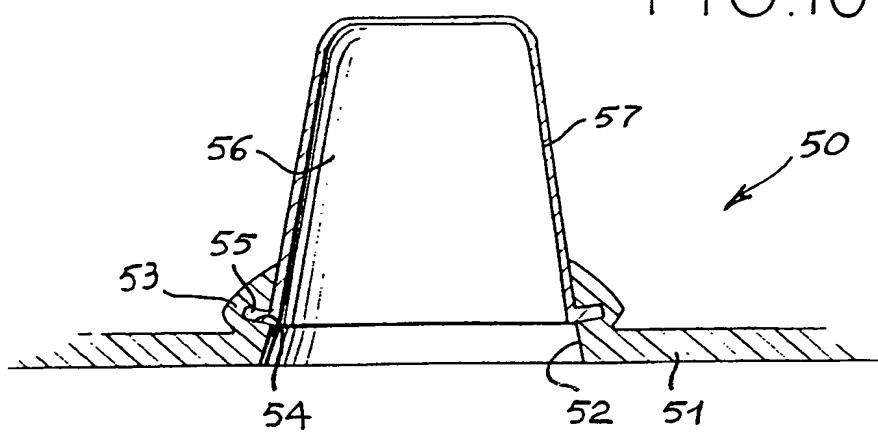
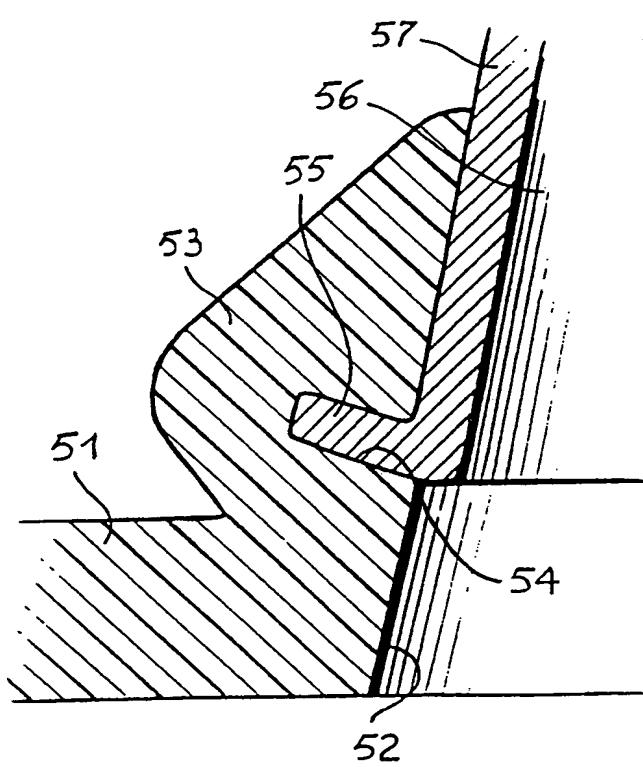


FIG.11



6/8

FIG.12

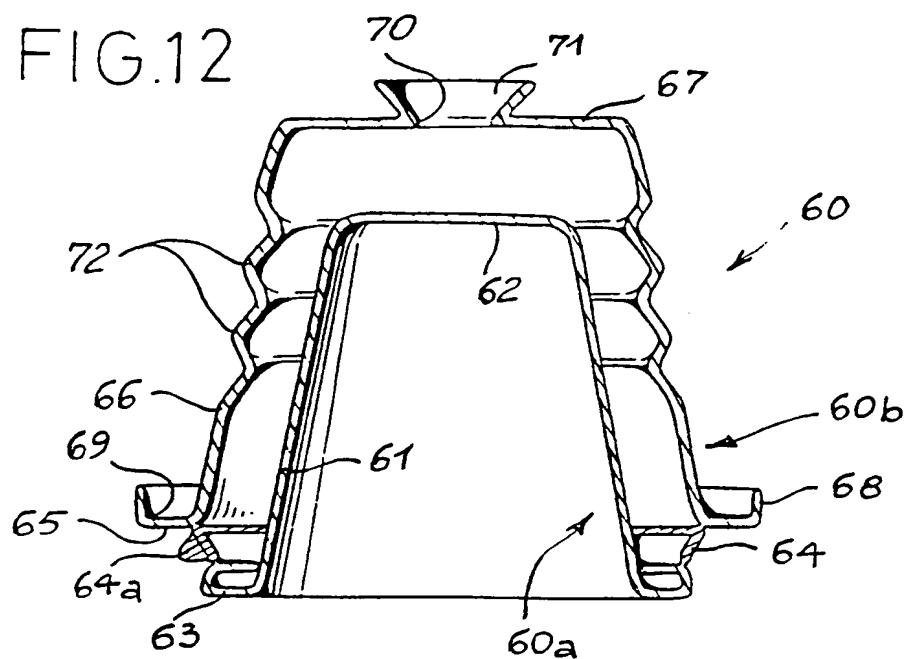


FIG.13

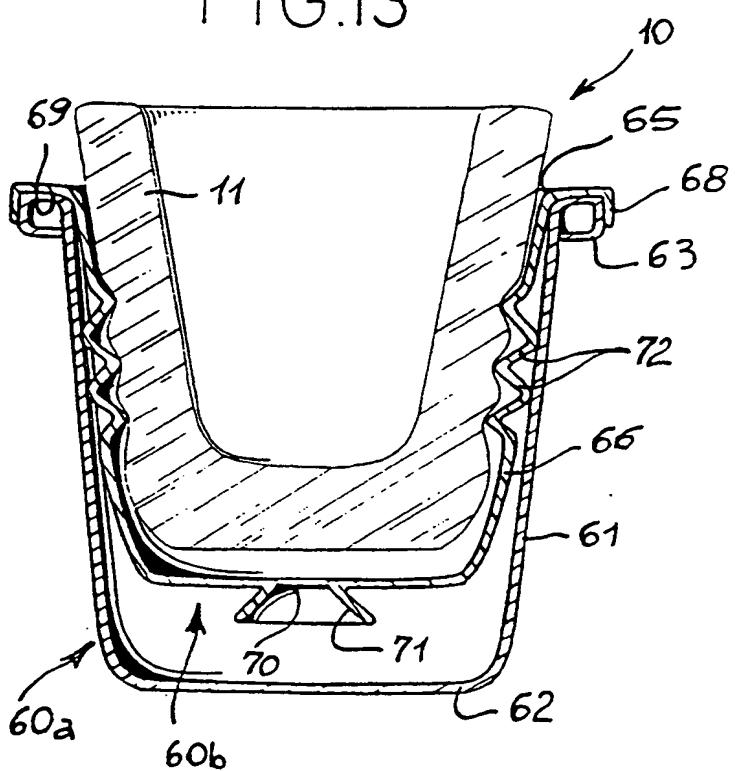


FIG.14

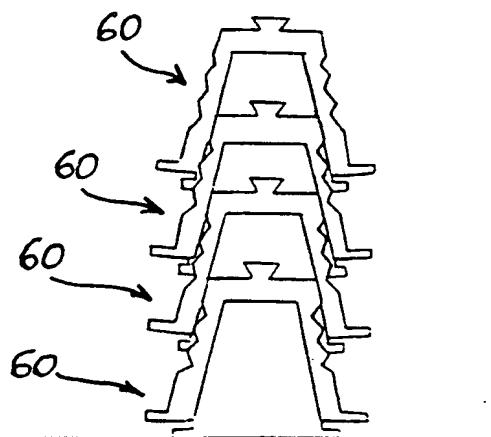


FIG.15

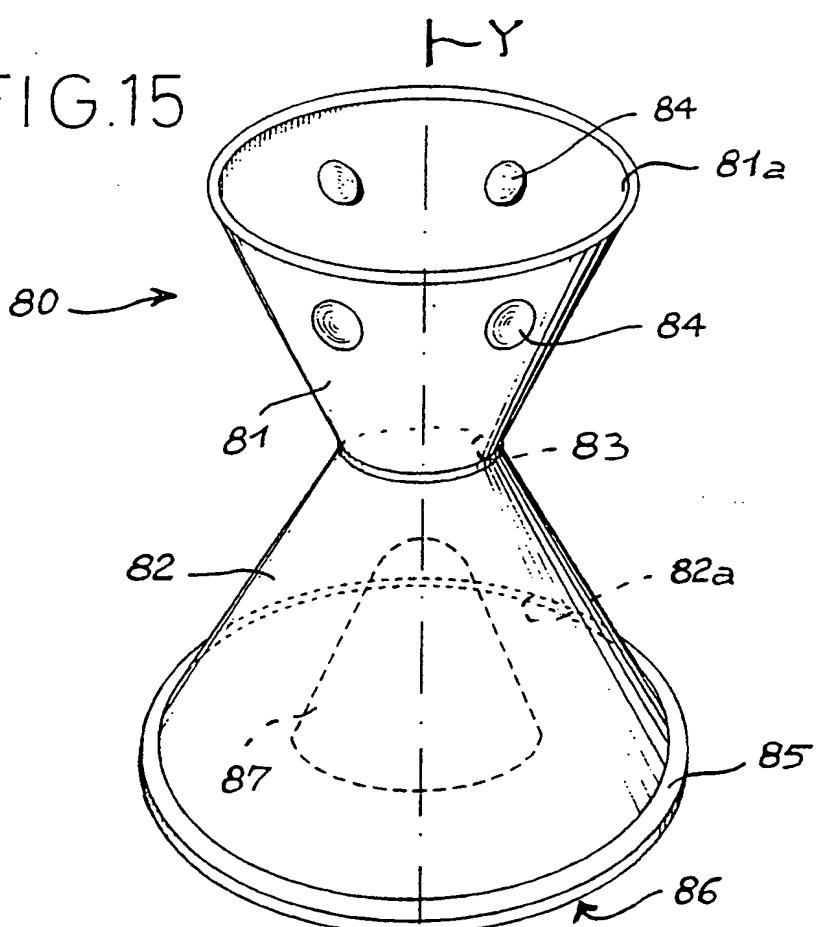


FIG.16

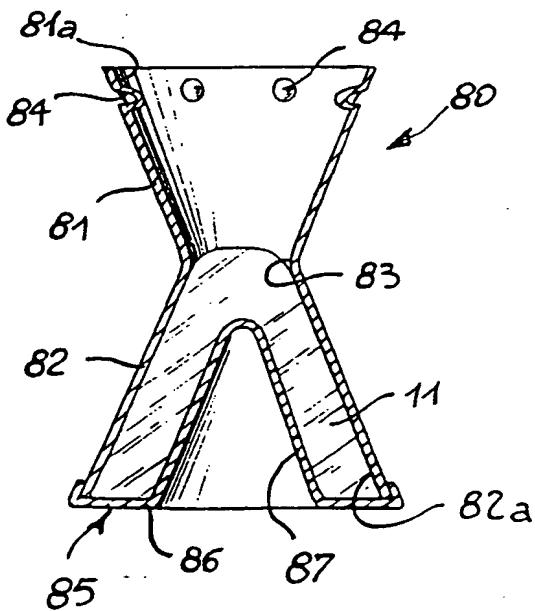
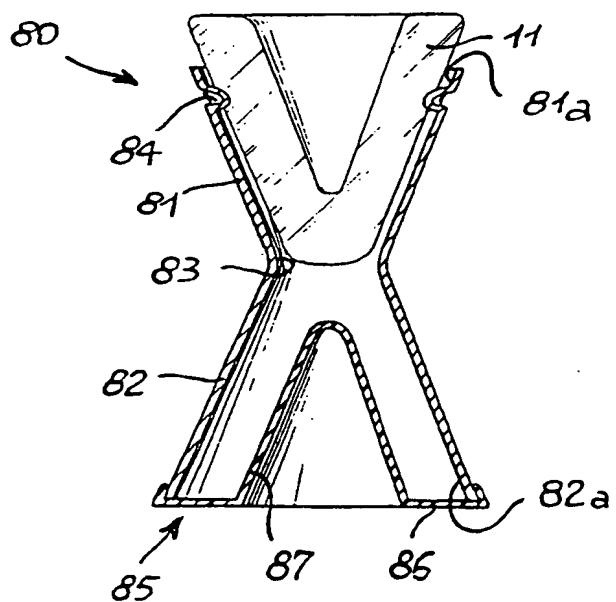
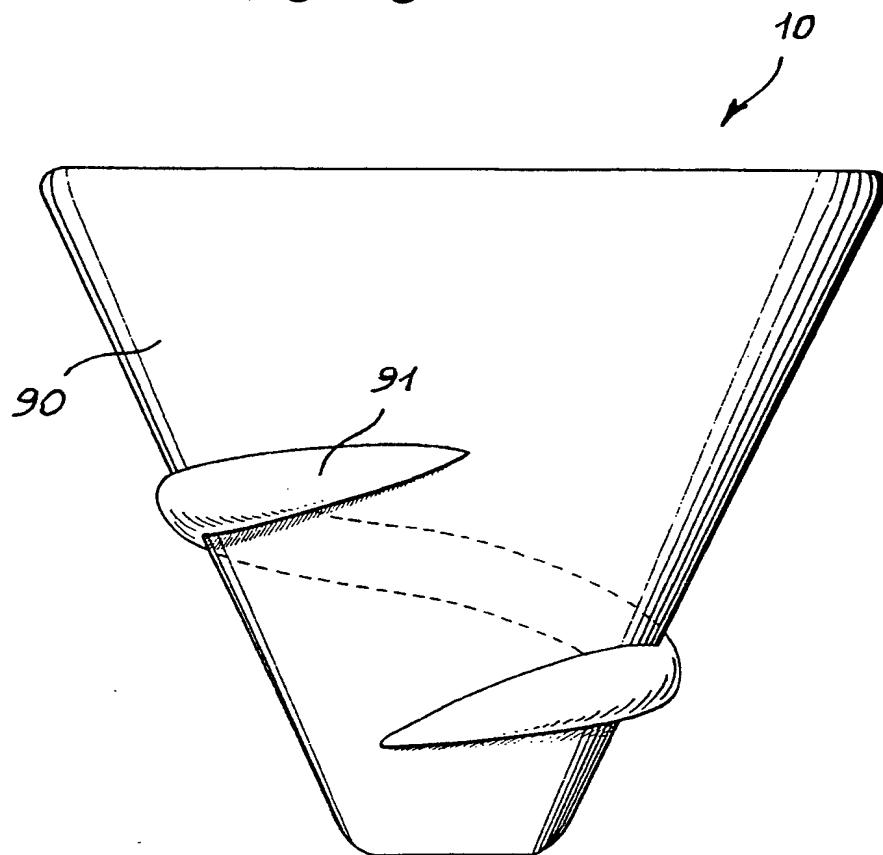
h_Y

FIG.17



8/8

FIG.18

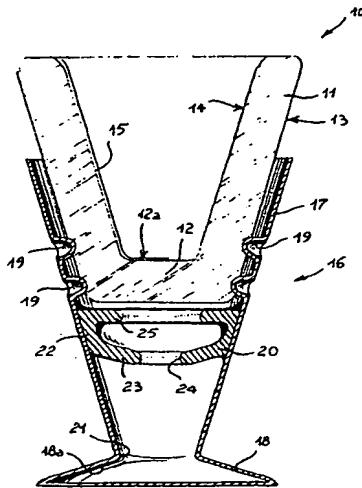




INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 7 : A47G 19/22, 23/02, F25D 3/08, F25C 1/22, 1/04		A3	(11) International Publication Number: WO 00/00066
			(43) International Publication Date: 6 January 2000 (06.01.00)
(21) International Application Number: PCT/IT99/00192		(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).	
(22) International Filing Date: 28 June 1999 (28.06.99)			
(30) Priority Data: BO98A000395 29 June 1998 (29.06.98) IT			
(71) Applicant (<i>for all designated States except US</i>): REALE S.R.L. [IT/IT]; Via Zanardi, 2/5°, I-40131 Bologna (IT).			
(72) Inventors; and		Published	
(75) Inventors/Applicants (<i>for US only</i>): GHEDINI, Lauro [IT/IT]; Via S. Isiaia, 15, I-40123 Bologna (IT). MONTANARI, Mario [IT/IT]; Via dell'Arcoveggio, 186, I-40129 Bologna (IT).		<i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i> <i>In English translation (filed in Italian).</i>	
(74) Agent: PROVVISIONATO, Paolo; Provvisionato & Co. S.r.l., Via Mascarella, 85, I-40126 Bologna (IT).		(88) Date of publication of the international search report: 27 April 2000 (27.04.00)	

(54) Title: A SUPPORT FOR SUPPORTING AN ICE BEAKER, A METHOD OF PRODUCING ICE BEAKERS AND AN ICE-MAKING MACHINE



(57) Abstract

A support (10) for an ice beaker (10) comprises a cup-shaped body with a side wall (17) and a base (18) for collecting the water resulting from the progressive melting of an ice beaker (10) housed in the cup-shaped body. The side wall (17) comprises regions (19), arranged spaced apart on the side wall, for supporting and restraining the outer wall (13) of an ice beaker (10). The ice beaker (10) can be produced by an ice-making machine comprising a condensation plate with housings for receiving atomized water to form frozen elements. Each housing of the condensation plate comprises a conical side wall and a base wall, the taper of the side wall being sufficiently wide to bring about the formation of a frozen element which has a central cavity so as to be generally beaker-shaped. In the production method, an intermediate waiting step of predetermined duration is interposed between the interruption of the cooling and the start of the heating of the condensation plate.

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece	ML	Mali	TR	Turkey
BG	Bulgaria	HU	Hungary	MN	Mongolia	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MR	Mauritania	UA	Ukraine
BR	Brazil	IL	Israel	MW	Malawi	UG	Uganda
BY	Belarus	IS	Iceland	MX	Mexico	US	United States of America
CA	Canada	IT	Italy	NE	Niger	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NL	Netherlands	VN	Viet Nam
CG	Congo	KE	Kenya	NO	Norway	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NZ	New Zealand	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	PL	Poland		
CM	Cameroon	KR	Republic of Korea	PT	Portugal		
CN	China	KZ	Kazakhstan	RO	Romania		
CU	Cuba	LC	Saint Lucia	RU	Russian Federation		
CZ	Czech Republic	LI	Liechtenstein	SD	Sudan		
DE	Germany	LK	Sri Lanka	SE	Sweden		
DK	Denmark	LR	Liberia	SG	Singapore		
EE	Estonia						

INTERNATIONAL SEARCH REPORT

Int. Application No
PCT/IT 99/00192

A. CLASSIFICATION OF SUBJECT MATTER	IPC 7 A47G19/22	A47G23/02	F25D3/08	F25C1/22	F25C1/04
-------------------------------------	-----------------	-----------	----------	----------	----------

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A47G F25D F25C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 93 06 465 U (GROLMAN) 8 July 1993 (1993-07-08) page 7, paragraph 2 -page 10, last paragraph; figures ---	1-3
X	DE 296 09 553 U (HERNFELD LUKAS) 22 August 1996 (1996-08-22) cited in the application page 3, paragraph 4 -page 6, last paragraph; figures ---	1, 3
X	WO 95 30865 A (MEI JACOB V D ;S & V PRODUKTONTWIKKELING BV (NL); SCHURINK PETER A) 16 November 1995 (1995-11-16) page 9, line 37 -page 10, line 22; figures 1-3 --- -/-	1

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *&* document member of the same patent family

Date of the actual completion of the international search

28 January 2000

Date of mailing of the international search report

06.03.00

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl.
Fax: (+31-70) 340-3016

Authorized officer

Vistisen, L

INTERNATIONAL SEARCH REPORTInt. Application No
PCT/IT 99/00192**C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT**

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 265 439 A (HOBELSSBERGER JOSEF) 30 November 1993 (1993-11-30) column 2, line 1 -column 15, line 58; figures -----	27-30

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IT 99/00192

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.: because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.: because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

3. Claims Nos.: because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

1-9 and 14-23 as far as dependent thereon; and 27-30

4. No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- The additional search fees were accompanied by the applicant's protest.
- No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-9 and claims 14-23 as far as dependent thereon

A support for an ice beaker comprising details relating to regions for supporting and restraining the ice beaker.

2. Claims: 1 and 10 -13 as far as dependent thereon

A support for an ice beaker comprising details relating to a flexible partition material

3. Claims: 1 and 14-23 as far as dependent thereon

A support for an ice beaker comprising mould members

4. Claim : 1 and 24

A support for an ice beaker having an hourglass-shaped body

5. Claims: 25-26

An ice-making machine

6. Claims: 27-30

A method of producing ice breakers

INTERNATIONAL SEARCH REPORT

Information on patent family members

In tional Application No

PCT/IT 99/00192

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
DE 9306465	U	08-07-1993	NONE		
DE 29609553	U	22-08-1996	AT	1870 U	26-01-1998
WO 9530865	A	16-11-1995	NL AU	9400740 A 2375095 A	01-12-1995 29-11-1995
US 5265439	A	30-11-1993	DE DE AT WO DE DK EP ES JP JP US	3909316 A 3914655 A 116735 T 9011479 A 59008201 D 464064 T 0464064 A 2069070 T 11153374 A 4504160 T 5970735 A	27-09-1990 13-12-1990 15-01-1995 04-10-1990 16-02-1995 15-05-1995 08-01-1992 01-05-1995 08-06-1999 23-07-1992 26-10-1999